Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (currently amended) An epoxy resin composite formed article composed of an epoxy resin and fibers, ~~characterized in that:~~

wherein the fibers are arranged along a first plane and molecular chains of the epoxy resin are oriented in a direction intersecting with the first plane therein,

~~and that~~ wherein a degree of orientation α of the molecular chains of the epoxy resin is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180\text{-}\Delta\beta/180) \quad (1)$$

wherein $\Delta\beta$ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° at a fixed peak scatter angle in the X-ray diffraction measurement, and

~~and that~~ wherein each of the thermal expansion coefficients of the epoxy resin composite formed article in the direction along the first plane and in the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the direction intersecting with the first plane is 30×10^{-6} (/K) or less.

2. (currently amended) The epoxy resin composite formed article according to claim 1, ~~characterized in that:~~ wherein the epoxy resin is a liquid crystalline epoxy resin having a mesogen group in its molecular.

3. (currently amended) The epoxy resin composite formed article according to ~~claims 1 or 2, characterized in that:~~ claim 1, wherein the fibers comprise at least one of a fiber cloth and single fibers.

4. (currently amended) The epoxy resin composite formed article according to ~~any one of claims 1 to 3, characterized in that:~~ claim 1, wherein the fibers consist of at least one selected from glass fibers, ceramic fibers, carbon fibers, metal fibers, and organic fibers.

5. (currently amended) A printed wiring board ~~formed of~~ comprising:

[[the]] an epoxy resin composite formed article ~~according to any one of claim 1 to 4, characterized in that~~ composed of an epoxy resin and fibers, wherein the fibers are arranged along a first plane and molecular chains of the epoxy resin are oriented in a direction intersecting with the first plane therein, wherein a degree of orientation α of the molecular chains of the epoxy resin is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180-\Delta\beta/180) \quad (1)$$

wherein $\Delta\beta$ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° at a fixed peak scatter angle in the X-ray diffraction measurement, and wherein each of the thermal expansion coefficients of the epoxy resin composite formed article in the direction along the first plane and in the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the direction intersecting with the first plane is 30×10^{-6} (/K) or less, and

an electrically conductive layer [[is]] provided on at least one of a surface and inside of the epoxy resin composite formed article.

6. (currently amended) A method for producing the epoxy resin composite formed article ~~according to any one of claims 1 to 4, characterized by~~ composed of an epoxy resin and fibers, wherein the fibers are arranged along a first plane and molecular chains of the epoxy resin are oriented in a direction intersecting with the first plane therein, wherein a degree of orientation α of the molecular chains of the epoxy resin is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180-\Delta\beta/180) \quad (1)$$

wherein $\Delta\beta$ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° at a fixed peak scatter angle in the X-ray diffraction measurement, and wherein each of the thermal expansion coefficients of the epoxy resin composite formed article in the direction along the first plane and in the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the

direction intersecting with the first plane is 30×10^{-6} (/K) or less, said method comprising the steps of:

disposing the fibers within a cavity of a mold in such a manner that the fibers are arranged along the first plane,

impregnating the fibers with an epoxy resin composition by filling the cavity of the mold with the epoxy resin composition,

orienting molecular chains of the epoxy resin in a direction intersecting with the first plane, and

curing the epoxy resin composition while the orientation of the molecular chains of the epoxy resin is maintained.

7. (currently amended) The method according to claim 6, ~~characterized in that:~~ wherein in the step of orienting the molecular chains of the epoxy resin, the orientation of the molecular chains of the epoxy resin is accomplished by application of a magnetic field thereto.

8. (currently amended) A method for producing the printed wiring board ~~according to claim 5, characterized by~~ including an epoxy resin composite formed article composed of an epoxy resin and fibers, wherein the fibers are arranged along a first plane and molecular chains of the epoxy resin are oriented in a direction intersecting with the first plane therein, wherein a degree of orientation α of the molecular chains of the epoxy resin is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180\text{-}\Delta\beta/180) \quad (1)$$

wherein $\Delta\beta$ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° at a fixed peak scatter angle in the X-ray diffraction measurement, and wherein each of the thermal expansion coefficients of the epoxy resin composite formed article in the direction along the first plane and in the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the direction intersecting with the first plane is 30×10^{-6} (/K) or less; and an electrically conductive layer provided on at least one of a surface and inside of the epoxy resin composite formed article, said method comprising the steps of:

disposing the fibers within a cavity of a mold in such a manner that the fibers are arranged along the first plane,

impregnating the fibers with an epoxy resin composition by filling the cavity of the mold with the epoxy resin composition,

orienting molecular chains of the epoxy resin in a direction intersecting with the first plane,

curing the epoxy resin composition while the orientation of the molecular chains of the epoxy resin is maintained, and

providing an electrically conductive layer on at least one of a surface and inside of the printed wiring board at least either prior to the step of disposing, or after the steps of impregnating, or curing.

9. (currently amended) The method according to claim 8, ~~characterized in that:~~ wherein in the step of orienting, the orientation of the molecular chains of the epoxy resin is accomplished by application of a magnetic field thereto.

10. (currently amended) A method for producing the epoxy resin composite formed article ~~according to any one of claims 1 to 4, characterized by~~ composed of an epoxy resin and fibers, wherein the fibers are arranged along a first plane and molecular chains of the epoxy resin are oriented in a direction intersecting with the first plane therein, wherein a degree of orientation α of the molecular chains of the epoxy resin is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180\text{-}\Delta\beta/180) \quad (1)$$

wherein $\Delta\beta$ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° at a fixed peak scatter angle in the X-ray diffraction measurement, and wherein each of the thermal expansion coefficients of the epoxy resin composite formed article in the direction along the first plane and in the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the direction intersecting with the first plane is 30×10^{-6} (/K) or less, said method comprising the steps of:

preparing an epoxy resin composition containing the fibers,

filing a cavity of a mold with the epoxy resin composition in such a manner that a major axis of each of the fibers are arranged along the first plane,

orienting molecular chains of the epoxy resin in a direction intersecting with the first plane, and

curing the epoxy resin composition, while the orientation of the molecular chains of the epoxy resin is maintained.

11. (currently amended) A thermoplastic polymer composite formed article composed of a thermoplastic polymer and fibers, ~~characterized in that:~~ wherein the fibers are arranged along a first plane and molecular chains of the thermoplastic polymer are oriented in a direction intersecting with the first plane therein,

~~and that~~ wherein a degree of orientation α of the molecular chains of the thermoplastic polymer is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180\text{-}\Delta\beta/180) \quad (1)$$

wherein $\Delta\beta$ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° with a fixed peak scatter angle in the X-ray diffraction measurement, and

~~and that~~ wherein each of the thermal expansion coefficients of the thermoplastic polymer composite formed article in the direction along to the first plane and in the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the direction intersecting with the first plane is 30×10^{-6} (/K) or less.

12. (currently amended) The thermoplastic polymer composite formed article according to claim 11, ~~characterized in that:~~ wherein the thermoplastic polymer is a liquid crystalline polymer having a mesogen group in its molecular.

13. (currently amended) The thermoplastic polymer composite formed article according to claims 12, ~~characterized in that:~~ wherein the liquid crystalline polymer is at least one selected from aromatic polyester, aromatic polyamide, and aromatic polyesteramide.

14. (currently amended) The thermoplastic polymer composite formed article according to ~~any one of claims 11 to 13, characterized in that:~~ claim 11, wherein the fibers comprise at least one of a fiber cloth and single fibers.

15. (currently amended) The thermoplastic polymer composite formed article according to ~~any one of claims 11 to 15, characterized in that:~~ claim 11, wherein the fibers consist of at least one selected from glass fibers, ceramic fibers, carbon fibers, metal fibers, and organic fibers.

16. (currently amended) A printed wiring board formed of the thermoplastic polymer composite formed article ~~according to any one of claims 11 to 15, characterized in that:~~ comprising:

a thermoplastic polymer composite formed article composed of a thermoplastic polymer and fibers, wherein the fibers are arranged along a first plane and molecular chains of the thermoplastic polymer are oriented in a direction intersecting with the first plane therein, wherein a degree of orientation α of the molecular chains of the thermoplastic polymer is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180\text{-}\Delta\beta/180) \quad (1)$$

wherein $\Delta\beta$ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° with a fixed peak scatter angle in the X-ray diffraction measurement, and wherein each of the thermal expansion coefficients of the thermoplastic polymer composite formed article in the direction along to the first plane and in the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the direction intersecting with the first plane is 30×10^{-6} (/K) or less; and

an electrically conductive layer ~~is~~ provided on at least one of a surface and inside of the thermoplastic polymer composite formed article.

17. (currently amended) A method for producing the thermoplastic polymer composite formed article ~~according to any one of claims 11 to 15, characterized by~~ composed of a thermoplastic polymer and fibers, wherein the fibers are arranged along a first plane and molecular chains of the thermoplastic polymer are oriented in a direction intersecting with the

first plane therein, wherein a degree of orientation α of the molecular chains of the thermoplastic polymer is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180-\Delta\beta/180) \quad (1)$$

wherein Δβ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° with a fixed peak scatter angle in the X-ray diffraction measurement, and wherein each of the thermal expansion coefficients of the thermoplastic polymer composite formed article in the direction along to the first plane and in the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the direction intersecting with the first plane is 30×10^{-6} (/K) or less, said method comprising the steps of:

disposing the fibers within a cavity of a mold in such a manner that the fibers are arranged along the first plane,

impregnating the fibers with a thermoplastic polymer composition by filling the cavity of the mold with the thermoplastic polymer composition,

orienting molecular chains of the thermoplastic polymer in a direction intersecting with the first plane, and

solidifying the thermoplastic polymer composition while the orientation of the molecular chains of the thermoplastic polymer is maintained.

18. (currently amended) A method for producing the thermoplastic polymer composite formed article ~~according to any one of claims 11 to 15, characterized by~~ composed of a thermoplastic polymer and fibers, wherein the fibers are arranged along a first plane and molecular chains of the thermoplastic polymer are oriented in a direction intersecting with the first plane therein, wherein a degree of orientation α of the molecular chains of the thermoplastic polymer is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180-\Delta\beta/180) \quad (1)$$

wherein Δβ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° with a fixed peak scatter angle in the X-ray diffraction measurement, and wherein each of the thermal expansion coefficients of the thermoplastic polymer composite formed article in the direction along to the first plane and in

the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the direction intersecting with the first plane is 30×10^{-6} (/K) or less, said method comprising the steps of:

forming a preform of a thermoplastic polymer composition containing the thermoplastic polymer,

disposing the preform and the fibers within a cavity of a mold in such a manner the preform and the fibers are arranged along the first plane,

impregnating the fibers with a thermoplastic polymer composition by melting the preform,

orienting molecular chains of the thermoplastic polymer in a direction intersecting with the first plane, and

solidifying the thermoplastic polymer composition while the orientation of the molecular chains of the thermoplastic polymer is maintained.

19. (currently amended) A method for producing the thermoplastic polymer composite formed article ~~according to any one of claims 11 to 15, characterized by~~ composed of a thermoplastic polymer and fibers, wherein the fibers are arranged along a first plane and molecular chains of the thermoplastic polymer are oriented in a direction intersecting with the first plane therein, wherein a degree of orientation α of the molecular chains of the thermoplastic polymer is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180\text{-}\Delta\beta/180) \quad (1)$$

wherein $\Delta\beta$ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° with a fixed peak scatter angle in the X-ray diffraction measurement, and wherein each of the thermal expansion coefficients of the thermoplastic polymer composite formed article in the direction along to the first plane and in the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the direction intersecting with the first plane is 30×10^{-6} (/K) or less, said method comprising the steps of:

preparing a thermoplastic polymer composition containing the thermoplastic polymer and the fibers,

filing a cavity of a mold with the thermoplastic polymer composition in such a manner that a major axis of each of the fibers are arranged along the first plane,

orienting molecular chains of the thermoplastic polymer in a direction intersecting with the first plane, and

solidifying the thermoplastic polymer composition, while the orientation of the molecular chains of the thermoplastic polymer is maintained.

20. (currently amended) The method according to ~~any one of claims 17 to 19, characterized in that:~~ claim 17, wherein in the step of orienting the molecular chains of the thermoplastic polymer in the direction intersecting with the first plane, the orientation of the molecular chains of the thermoplastic polymer is accomplished by application of a magnetic field thereto.

21. (currently amended) A method for producing the printed wiring board ~~according to claim 16, characterized by~~ including a thermoplastic polymer composite formed article composed of a thermoplastic polymer and fibers, wherein the fibers are arranged along a first plane and molecular chains of the thermoplastic polymer are oriented in a direction intersecting with the first plane therein, wherein a degree of orientation α of the molecular chains of the thermoplastic polymer is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180-\Delta\beta/180) \quad (1)$$

wherein $\Delta\beta$ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° with a fixed peak scatter angle in the X-ray diffraction measurement, and wherein each of the thermal expansion coefficients of the thermoplastic polymer composite formed article in the direction along to the first plane and in the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the direction intersecting with the first plane is 30×10^{-6} (/K) or less; and an electrically conductive layer provided on at least one of a surface and inside of the thermoplastic polymer composite formed article, said method comprising the steps of:

disposing the fibers within a cavity of a mold in such a manner that the fibers are arranged along the first plane,

impregnating the fibers with a thermoplastic polymer composition by filling the cavity of the mold with the thermoplastic polymer composition,

orienting molecular chains of the thermoplastic polymer in a direction intersecting with the first plane,

solidifying the thermoplastic polymer composition while the orientation of the molecular chains of the thermoplastic polymer is maintained, and

providing an electrically conductive layer on at least one of a surface and inside of the printed wiring board at least either prior to the step of disposing, or after the steps of impregnating, or solidifying.

22. (currently amended) A method for producing the printed wiring board ~~according to claim 16, characterized by~~ including a thermoplastic polymer composite formed article composed of a thermoplastic polymer and fibers, wherein the fibers are arranged along a first plane and molecular chains of the thermoplastic polymer are oriented in a direction intersecting with the first plane therein, wherein a degree of orientation α of the molecular chains of the thermoplastic polymer is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180-\Delta\beta/180) \quad (1)$$

wherein $\Delta\beta$ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° with a fixed peak scatter angle in the X-ray diffraction measurement, and wherein each of the thermal expansion coefficients of the thermoplastic polymer composite formed article in the direction along to the first plane and in the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the direction intersecting with the first plane is 30×10^{-6} (/K) or less; and an electrically conductive layer provided on at least one of a surface and inside of the thermoplastic polymer composite formed article, said method comprising the steps of:

forming a preform of a thermoplastic polymer composition containing the thermoplastic polymer,

disposing the preform and the fibers within a cavity of a mold in such a manner the preform and the fibers are arranged along the first plane,

impregnating the fibers with an thermoplastic polymer composition by melting the preform,

orienting molecular chains of the thermoplastic polymer in a direction intersecting with the first plane,

solidifying the thermoplastic polymer composition while the orientation of the molecular chains of the thermoplastic polymer is maintained, and

providing an electrically conductive layer on at least one of a surface and inside of the printed wiring board at least either prior to the step of disposing, or after the steps of impregnating, or solidifying.

23. (currently amended) A method for producing the printed wiring board according to claim 16, ~~characterized by~~ including a thermoplastic polymer composite formed article composed of a thermoplastic polymer and fibers, wherein the fibers are arranged along a first plane and molecular chains of the thermoplastic polymer are oriented in a direction intersecting with the first plane therein, wherein a degree of orientation α of the molecular chains of the thermoplastic polymer is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180\text{-}\Delta\beta/180) \quad (1)$$

wherein $\Delta\beta$ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° with a fixed peak scatter angle in the X-ray diffraction measurement, and wherein each of the thermal expansion coefficients of the thermoplastic polymer composite formed article in the direction along to the first plane and in the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the direction intersecting with the first plane is 30×10^{-6} (/K) or less; and an electrically conductive layer provided on at least one of a surface and inside of the thermoplastic polymer composite formed article, said method comprising the steps of:

preparing a thermoplastic polymer composition containing the thermoplastic polymer and the fibers,

filing a cavity of a mold with the thermoplastic polymer composition in such a manner that a major axis of each of the fibers are arranged along the first plane,

orienting molecular chains of the thermoplastic polymer in a direction intersecting with the first plane, and

solidifying the thermoplastic polymer composition, while the orientation of the molecular chains of the thermoplastic polymer is maintained, and

providing an electrically conductive layer on at least one of a surface and inside of the printed wiring board at least either prior to the step of disposing, or after the steps of impregnating, or solidifying.

24. (currently amended) The method according to ~~any one of claims 21 to 23~~, ~~characterized in that:~~ claim 21, wherein in the step of orienting the molecular chains of the thermoplastic polymer in the direction intersecting with the first plane, the orientation of the molecular chains of the thermoplastic polymer is accomplished by application of a magnetic field thereto.

25. (currently amended) A polymer composite formed article composed of a polymer and fibers, ~~characterized in that:~~

wherein the fibers are arranged along a first plane and molecular chains of the polymer are oriented in a direction intersecting with the first plane therein,

~~and that~~ wherein a degree of orientation α of the molecular chains of the polymer is in a range of 0.5 or more and less than 1, as determined by the following expression (1) based on X-ray diffraction measurement,

$$\text{Degree of orientation } \alpha = (180\text{-}\Delta\beta/180) \quad (1)$$

wherein $\Delta\beta$ represents a full width at half maximum in an intensity distribution measured in an azimuth angle direction from 0 to 360° with a fixed peak scatter angle in the X-ray diffraction measurement, and

~~and that~~ wherein each of the thermal expansion coefficients of the polymer composite formed article in the direction along the first plane and in the direction intersecting with the first plane is in a range of 5×10^{-6} to 50×10^{-6} (/K) and a difference between the thermal expansion coefficients in the direction along the first plane and in the direction intersecting with the first plane is 30×10^{-6} (/K) or less.

26.(new) The method according to claim 18, wherein in the step of orienting the molecular chains of the thermoplastic polymer in the direction intersecting with the first plane, the orientation of the molecular chains of the thermoplastic polymer is accomplished by application of a magnetic field thereto.

27.(new) The method according to claim 19, wherein in the step of orienting the molecular chains of the thermoplastic polymer in the direction intersecting with the first plane, the orientation of the molecular chains of the thermoplastic polymer is accomplished by application of a magnetic field thereto.

28.(new) The method according to claim 22, wherein in the step of orienting the molecular chains of the thermoplastic polymer in the direction intersecting with the first plane, the orientation of the molecular chains of the thermoplastic polymer is accomplished by application of a magnetic field thereto.

29.(new) The method according to claim 23, wherein in the step of orienting the molecular chains of the thermoplastic polymer in the direction intersecting with the first plane, the orientation of the molecular chains of the thermoplastic polymer is accomplished by application of a magnetic field thereto.